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PATENT & TRADEMARK OFFICE

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Appeal to the Board of Patent Appeals and Interferences

In re PATENT application of KRISHNA et al.

Group Art Unit: 2154

Application No. 09/618,291

Examiner: DONAGHUE, Larry D.

Filed: July 18, 2000

Title: Flow Control Arrangement in a Network Switch Based on Priority Traffic

Docket : 95-320

Date: May 6, 2005

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1 [ ] **NOTICE OF APPEAL**: Applicant hereby appeals to the Board of Patent Appeals and Interferences from the decision (not Advisory Action) dated December 10, 2004 of the Examiner twice/finally rejecting claims 1, 3-12, 14-17

2 [X] **BRIEF** on appeal in this application attached in triplicate.

3 [ ] An **ORAL HEARING** is respectfully requested under Rule 194 (due two months after Examiner's Answer -- unextendable).

4 [ ] Reply Brief is attached in triplicate (due two months after Examiner's Answer -- unextendable).

5. **FEE CALCULATION:**		Large/Small Entity	
If box 1 above is X'd, see box 12 below first and decide: . . . . enter		$500/250*	$
If box 2 above is X'd, see box 12 below first and decide: . . . . enter		$500/250*	$ 500.00
If box 3 above is X'd, see box 12 below first and decide: . . . . enter		$1000/500*	$
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6. **Original due date: May 10, 2005**			
7. **Petition is hereby made** to extend the original due date to cover the date this response is filed for which the requisite fee is attached (1 mo) (2mos) (3mos) (4mos)	$120/$60 $450/$225 $1020/$510 $1590/$795	+	
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11. [ ] *Fee NOT required if/since paid in prior appeal in which the Board of Patent Appeals and Interferences did not render a decision on the merits.

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Docket No.: 95-320

OIPE JC98 MAY 0 6 2005 PATENT & TRADEMARK OFFICE

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	
KRISHNA	:	
Serial No.: 09/618,291	:	Group Art Unit: 2154
Filed: July 18, 2000	:	Examiner: DONAGHUE, Larry D

For: FLOW CONTROL ARRANGEMENT IN A NETWORK SWITCH BASED ON PRIORITY TRAFFIC

MAIL STOP: <u>APPEAL BRIEF – PATENTS</u>
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

This is an appeal from the final rejection of claims 1, 3-12, and 14-17 in the above-identified patent application.

This Appeal Brief is submitted in triplicate as required by 37 C.F.R. §1.192(a).

1. Real Party in Interest:

This application is assigned to Advanced Micro Devices, Inc., the real party of interest.

2. Related Appeals and Interferences:

There are no other appeals or interferences known to Appellant that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

3. Status of Claims:

Claims 1, 3-12, and 14-17 are pending in this application. Claims 1, 3-12, and 14-17 stand rejected by the Examiner. Claims 1, 3-12, and 14-17 are appealed.

4. Status of any Amendment File Subsequent to Final Rejection:

No Amendment was filed in response to the Final Rejection. A Response to the Final Rejection was filed on February 8, 2005.

5. Summary of Invention:

The invention relates to a network switch (e.g., 12a of Fig. 1), configured for performing layer 2 (and above) switching in a local area network (10 of Fig. 1), such as an Ethernet (IEEE 802.3) network, without blocking of incoming data packets (page 1, lines 2-3 of the specification). The invention addresses the problem of generating flow control frames (e,g, "pause frames") on network switch ports in response to detected congestion in the network switch: reception of a flow control frame by a transmitting node causes the transmitting node to temporarily halt transmission to enable a receiver to relieve its congestion (see, e.g., page 1, lines 20-26 and U.S. Patent Nos. 5,673,254, 5,859,837 and 5,905,870, of record in this application and

cited at page 1, lines 22-24 of the specification).

However, halting transmission in response to reception of a flow control frame may interfere with transmitting network node attempting to transmit high priority traffic, creating a conflict between the need for congestion control and the need for maintaining reliable transport for high priority traffic (page 1, line 27 to page 2, line 5).

The invention is illustrated by a network switch (12) that includes network switch ports (20 of Fig. 1), a flow control module (30 of Figs. 1, 2), and a switch fabric (25 of Figure 1) configured for executing layer 2 switching decisions for received data packets (e.g., page 4, lines 2-7). Each switch port (20) includes a media access control (MAC) module (22 of Figure 1) configured for sending and receiving IEEE 802 packets, and port filters 24 (page 3, lines 31-33). Each port filter 24 is configured for identifying a priority of a received data packet, and sending the priority information to the flow control module (page 3, line 33 to page 4, line 1; page 5, lines 7-16 and 21-26; page 6, lines 9-12). The flow control module (30) determines which of the network switch ports 20 should output a flow control frame based on the determined depletion of network switch resources and based on the corresponding priority value of the network traffic on each network switch port (steps 64, 66, 68 of Fig. 3) (page 5, lines 29-33; page 6, lines 13-28).

Hence, the invention of claim 1 is directed to a method in an integrated network switch (12 of Fig. 1) having a plurality of switch ports (20 of Fig. 1). The method includes first determining a priority for each data frame received on a corresponding network switch port (step 62 of Fig. 3), each network switch port including a port filter (24 of Fig. 1) configured for determining the corresponding priority for the corresponding received data frame, the first

determining including determining, by the corresponding port filter of the corresponding network switch port having received the data frame, the corresponding priority for the corresponding data frame (step 62 of Fig. 3, page 6, lines 9-12). The method also includes second determining a depletion of network switch resources (step 64 of Fig. 3, page 5, lines 29-33 and page 6, lines 13-17), and selectively outputting a flow control frame (step 68 of Fig. 3) on the network switch port based on the determined depletion of network switch resources relative to the determined priority (steps 66, 68 and page 6, lines 17-28).

The invention of claim 3 adds to the invention of claim 1 by storing the determined priority within a table (40 of Fig. 2) configured for storing the determined priority for each of a plurality of the network switch ports (page 5, lines 21-26).

The invention of claim 4 adds to the invention of claim 3 by determining in the second determining step whether an availability of the network switch resources falls below a first prescribed threshold value (step 64 of Fig. 3, page 6, lines 14-17).

The invention of claim 5 adds to the invention of claim 4 by further comprising setting the first prescribed threshold value based on a user-defined priority threshold (step 60 of Fig. 3, page 6, lines 3-8).

The invention of claim 6 adds to the invention of claim 5, wherein the setting step includes setting a plurality of prescribed threshold values, including the first prescribed threshold value, based on a plurality of the user-defined priority threshold, respectively (table 42 of Fig. 2, step 60 of Fig. 3, page 6, lines 3-8).

The invention of claim 7 adds to the invention of claim 6, wherein the first determining

step includes determining the priority from a plurality of available priority values (stored in port table 40 of Fig. 2); the second determining step includes determining whether the availability of the network resources has fallen below an identified one of the prescribed threshold values (T1, T2, T3 in table 42 of Fig. 2, page 6, lines 14-28); and the selectively outputting step includes identifying from the table the network switch ports having respective priority values less than the corresponding user-defined priority threshold for the identified one prescribed threshold value (step 66 of Fig. 3, page 6, lines 17-20).

The invention of claim 8 adds to the invention of claim 6, wherein the step of setting the plurality of prescribed threshold values includes storing the prescribed threshold values and the respective user-defined priority thresholds in a second table (42 of Fig. 2, page 6, lines 3-8).

The invention of claim 9 adds to the invention of claim 3 by deleting the determined priority from the table after a prescribed aging interval (step 70 of Fig. 3, page 6, lines 29-30).

The invention of claim 10 adds to the invention of claim 3 by setting a plurality of prescribed threshold values based on a plurality of respective user-defined priority thresholds (table 42 of Fig. 2, step 60 of Fig. 3, page 6, lines 3-8).

The invention of claim 11 adds to the invention of claim 10, wherein the first determining step includes determining the priority from a plurality of available priority values (stored in port table 40 of Fig. 2); the second determining step includes determining whether the availability of the network resources has fallen below an identified one of the prescribed threshold values (T1, T2, T3 in table 42 of Fig. 2, page 6, lines 14-28); and the selectively outputting step includes identifying from the table the network switch ports having respective priority values less than the

corresponding user-defined priority threshold for the identified one prescribed threshold value (step 66 of Fig. 3, page 6, lines 17-20).

The invention of claim 12 is directed to an integrated network switch (e.g., 12a of Fig. 1, page 3, lines 24-25). The integrated network switch includes a plurality of network switch ports (20 of Fig. 1), each configured for receiving a data packet and selectively outputting a flow control frame (step 68 of Fig. 3) in response to a flow control output signal (S of Fig. 2), each network switch port including a port filter (24 of Fig. 1) configured for determining a corresponding determined priority value for the corresponding received data packet (page 3, line 33 to page 4, line 1; page 5, lines 7-16 and 21-26; page 6, lines 9-12). The integrated network switch also includes a flow control module (30 of Fig. 1) configured for determining a depletion of network switch resources (page 4, lines 32-35), the flow control module configured for storing, for each of the network switch ports, the corresponding determined priority value based on the corresponding received data packet (port table 40 of Fig. 2, page 5, lines 21-26), the flow control module selectively outputting the flow control output signal to selected ones of the network switch ports based on the determined depletion of network switch resources relative to the respective determined priority values (32 of Fig. 2, steps 64, 66, 68 of Fig. 3, page 5, lines 29-33; page 6, lines 13-28).

The invention of claim 14 adds to the invention of claim 13, wherein the flow control module (30 of Fig. 2) includes a first table (40 of Fig. 2) configured for storing the determined priority values for the respective network switch ports (page 5, lines 21-26), and a second table (42 of Fig. 2) configured for storing a plurality of prescribed resource threshold values and

respective user-defined priority thresholds (step 60 of Fig. 3, page 6, lines 3-8), the flow control module configured for determining whether the availability of the network resources has fallen below an identified one of the prescribed resource threshold values (step 64 of Fig. 3, page 5, lines 29-33 and page 6, lines 13-17).

The invention of claim 15 adds to the invention of claim 14, wherein the flow control module is configured for selecting the selected ones of the network switch ports based on the respective determined priority values being less than the corresponding user-defined priority threshold for the identified one prescribed resource threshold value (steps 66 and 68, page 6, lines 17-28).

The invention of claim 16 adds to the invention of claim 14 a free buffer queue (50 of Fig. 2) configured for storing unused frame pointers, each unused frame pointer specifying a corresponding buffer memory location available for storage of frame data (page 5, line 31 to page 6, line 2), the flow control module configured for determining the depletion of network switch resources based on a comparison between a number of the unused frame pointers in the free buffer queue relative to the prescribed resource threshold values (step 64 of Fig. 3, page 6, lines 13-17).

The invention of claim 17 adds to the invention of claim 12, wherein the flow control module deletes the determined priority value for a selected one of the network switch ports after a prescribed aging interval (34 of Fig. 2, step 70 of Fig. 3, page 6, lines 29-30).

6. Issues:

A. Whether claims 1 and 3 are patentable under 35 U.S.C. §102(e) as not having been anticipated by U.S. Patent Publication No. 2003/0133406 to Fawaz et al. (hereinafter "Fawaz").

B. Whether claim 12 is patentable under 35 U.S.C. §102(e) as not having been anticipated by Fawaz.

C. Whether claims 4-11 are patentable under 35 U.S.C. §103(a) as not having been obvious in view of Fawaz.

D. Whether claims 14-17 are patentable under 35 U.S.C. §103(a) as not having been obvious in view of Fawaz.

7. Grouping of Claims:

With regard to the rejections, claims 1 and 3 stand or fall together, but claim 12 stands separately from claims 1 and 3 and does not stand or fall together with claims 1 and 3; claims 4-11 stand separately from claims 14-17 and claims 14-17 do not stand or fall together with claims 4-11.

8. Arguments:

A1. **Claim 1 is patentable under 35 U.S.C. §102(e) over Fawaz.**

In the Final Office Action, the Examiner rejected claim 1 under 35 USC §102(e) in view of Fawaz. Claim 1 is neither anticipated nor rendered obvious by Fawaz for the following reasons.

Claim 1 specifies a method in a network switch having a plurality of network switch ports, including "determining a priority for each data frame received on a corresponding network switch port, ***each network switch port including a port filter configured for determining the corresponding priority for the corresponding received data frame***, the first determining including determining, ***by the corresponding port filter of the corresponding network switch port having received the data frame, the corresponding priority for the corresponding data frame***".

As described in the specification (e.g., page 5, lines 8-16), the distributed packet classification of the received data packets by the port filters 24 of the switch ports 20 receiving the packet enable port filters to simultaneously determine the presence of multiple user-selected attributes as the data frame is received, reducing processing requirements in the switch fabric 25 or the flow control module 30 (see, e.g., page 5, lines 8-16).

Claim 1 also specifies determining a depletion of network switch resources, and "selectively outputting a ***flow control frame*** on the network switch port based on the determined depletion of network switch resources relative to the determined priority." As described in the specification (e.g., page 1, lines 20-26), flow control frames (e.g., Pause frames in full duplex networks, backpressure frames in half duplex) cause transmitting stations to temporarily suspend transmission to relieve congestion in the receiving station.

Hence, a network switch port ***selectively*** outputs a flow control frame based on the determined depletion of network switch resources relative to the determined priority: if the determined depletion is greater than the determined priority, the network switch port outputs the

flow control frame (causing the transmitting network node to halt transmission), else the network switch port does not output the flow control frame (enabling the transmitting network node to continue transmitting the relatively high-priority data frames).

Hence, flow control is implemented on a per-port basis, where a flow control frame is selectively output based on the determined depletion relative to the determined priority.

As demonstrated below, Fawaz neither discloses nor suggests the claimed features of: (1) determining a priority for each data frame by the corresponding network switch port having received the data frame; or (2) selectively outputting a flow control frame based on the determined depletion of network switch resources relative to the determined priority.

Fawaz describes a packet switched network 100 (Fig. 4) that provides a guaranteed minimum bandwidth between pairs of packet switches 108 (square elements) via Quality of Service (QoS) Nodes 102 or 106 (circle elements) by defining Service Level Agreements (SLAs): the SLAs of each packet are defined by at least a source identifier identifying the source packet switch 108 (e.g., "A"), a destination identifier identifying the destination packet switch 108 (e.g., "B"), and a minimum data rate (Abstract, lines 1-6; paragraph 22, lines 1-4, par. 41, 44, 45, 47).

First and second embodiments of QoS nodes 102, 106 are illustrated in Figs. 6 and 8, respectively (par. 51, 69). Fawaz describes that "QoS nodes 102, 106 [may] include ethernet interfaces that operate at 1Gbps" (par. 42, lines 1-2), and illustrates those ethernet interfaces as "input buffers" 302, 402 in the first and second embodiments illustrated in Figs. 6 and 8, respectively. Figures 6 and 8 both illustrate the received packets are classified centrally by a

classifier:

> [0051] A first embodiment of a node 102, 106 is shown in FIG. 6. Upon arrival at a QoS Node 102, 106, packets (e.g., ethernet frames) are placed into an input buffer 302. ***Subsequently***, classifier 304 classifies each packet in accordance with an SLA. To do so, classifier 304 reads at least the source and destination identifier of the packet to be classified, for instance, Layer 2 ethernet frame addresses. The classifier 304 then correlates the pair of identifiers with a corresponding SLA. ...
>
> (Par. 51, lines 1-9).
>
> [0053] In one embodiment of the invention, once an SLA has been identified for the packet using the various classification information, the packet is placed into a FIFO-type buffer 306-312 that corresponds to the SLA, forming a queue of packets for the SLA.
>
> (Par. 53, lines 1-5).

Fawaz further describes that "[o]nce the packets have been classified according to their SLA, the packets are scheduled for transmission by scheduler 316 and placed in an appropriate output port 317." (Par. 54, lines 1-3). The embodiment of Fig. 8 differs simply by using an aggregate queue for all SLA's, as opposed to a single queue per SLA is in Fig. 6 (par. 69).

Hence, Fawaz describes that packets are: (1) received via ethernet interfaces illustrated as input buffers 302 (Fig 6) or 402 (Fig. 8); (2) ***subsequently*** the centralized classifier 304 (Fig. 6) or 404 (Fig. 8) classifies each packet in accordance with an SLA; and (3) places the classified packet in a queue for scheduled transmission based on the SLA.

Fawaz provides no disclosure or suggestion whatsoever that there is any packet classification in each network switch port, as claimed. As apparent from the foregoing, Fawaz relies on a centralized classifier 304 (Fig. 6) or 404 (Fig. 8), that classifies the packet ***subsequent to*** reception by the multiple input buffers 302 (Fig. 6) or 402 (Fig. 8).

Moreover, there is no disclosure or suggestion whatsoever that Fawaz would have been modified by one skilled in the art to implement the classifier 302/402 within each input buffer 302 (402), since such a modification would render inoperable the ability of the classifier 304 to move a classified packet into the appropriate SLA buffer 306-312 (see par. 53 quoted above).

Hence, Fawaz provides no disclosure or suggestion of "determining, by the corresponding port filter of the corresponding network switch port having received the data frame, the corresponding priority for the corresponding data frame" because Fawaz explicitly teaches that all classification is performed by the single classifier 304/404 ***subsequently*** after receipt by the respective Ethernet interfaces (illustrated in Figs. 6, 8) simply as input buffers 302/402.

Fawaz also provides no disclosure or suggestion of the claimed "selectively outputting a ***flow control frame*** on the network switch port based on the determined depletion of network resources relative to the determined priority."

As described above, the specification describes flow control as "reduc[ing] network congestion in a network switch, where a sending station ***temporarily suspends transmission*** of data packets." (Page 1, lines 20-21). Further, the above-cited patents demonstrate that one skilled in the art interprets "flow control frame" as a frame that causes a sending station to temporarily suspend transmission of ***all data packets***. Hence, "claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification in giving them their 'broadest reasonable interpretation.'" MPEP § 2111.01 at 2100-37 (Rev. 1, Feb. 2000) (quoting In re Marosi, 218 USPQ 289, 292 (Fed. Cir. 1983)(emphasis in original)).

Fawaz described congestion control in paragraphs 76-79 in terms of congested SLAs

(defined as between a source node and a destination node), and neither discloses nor suggests selectively outputting ***flow control frames***, as claimed. Rather, Fawaz maintains a list 318/418 of all congested SLAs (Fig. 6/8) (and not determined priorities, as asserted), and **periodically** sends a "control message" that specifies the current list of congested SLAs, enabling the QoS nodes to maintain and update their own list of congested SLAs:

> ***Periodically***, the QoS Node sends a control message to its neighboring QoS Nodes, including a current list of all congested SLA's. Each QoS Node uses these control messages to maintain and update its own list of the congested SLA's. The scheduler (316 in FIG. 6) for each QoS Node then skips (does not schedule any packets from) every SLA queue marked as congested. Alternatively, the QoS Node can simply reduce the rate of transmission for the SLA, e.g., to the minimum guaranteed rates.
>
> (Par. 78, lines 13-21).

Fawaz also demonstrates that the control message does not halt transmission, even on affected output ports, but simply changes which packets are output by the output port:

> [0079] FIG. 10 shows three streams A, B, C transmitting with rates 0.2, 0.6, and 0.2, respectively, ***and that share an output port*** of the first QoS Node 702 that has an output port rate 1. The SLAs for A, B, and C have minimum rates of 0.2 each. However, the scheduler lets stream B be overactive. As a result, the queue for SLA-B in the second QoS Node 703 gets saturated: the five SLAs in node 703 each get a service rate of 0.2 but the input of the queue for the SLA-B in the second QoS Node 703 has rate 0.6. The second QoS Node 703 sends a message to QoS Node 702 indicating that QoS Node 702 should stop transmitting packets ***from SLA-B*** or reduce the transmission rate to the minimum guaranteed rate, e.g., 0.6. Hence, backpressure is asserted at the source of SLA-B. Only those SLA queues that are congested are switched off or rate reduced--not the entire QoS Node. In other words, the SLAs for A and C will continue to transmit. ***In contrast, conventional network flow control techniques actually stops the entire flow from a switch when congestion is detected.***

Hence, Fawaz acknowledges that "conventional network flow control techniques" actually stop the entire flow "when congestion is detected". However, Fawaz neither discloses

nor suggests ***selectively*** outputting a flow control frame that causes a transmitting node to ***halt transmission of all data on that output port***, based on the determined depletion of network switch resources ***relative to the determined priority***: rather, Fawaz periodically sends out the control message to all its neighboring nodes, and permits continued transmission on the output port of packets associated with unaffected SLAs.

Further, Fawaz stresses avoidance of conventional flow control techniques by describing a different congestion control technique that entirely eliminates the use of flow control frames! Rather, Fawaz uses "control messages" to ***control the supply of data packets from different SLAs on a given output port.***

Finally, the backpressure asserted by node 702 "at the source of SLA-B" is not based on determining the depletion of network switch resources in node 702, but in response to a control message from node 703: no information regarding depletion of **network switch resources** is sent from node 703 to 702, but simply a request that transmission of packets associated by SLA-B should be stopped or reduced.

Consequently, Fawaz provides no disclosure whatsoever of any selective output of a flow control frame on any given port, because Fawaz instead outputs "control messages" ***on a periodic basis*** that specify the congested SLAs.

The law is well settled that a claim is not anticipated unless the reference unequivocally discloses each and every element in the claim. As specified in MPEP §2131: "'A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference' *Verdegaal Bros. V. Union Oil Co. of*

California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... 'The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)." MPEP 2131 (Rev. 2, May 2004, at p. 2100-73).

Hence, the rejection of claim 1 should be reversed because it fails to demonstrate that the applied reference discloses <u>each and every element of the claim</u>. "Anticipation cannot be predicated on teachings in the reference which are vague or based on conjecture." <u>Studiengesellschaft Kohle mbH v. Dart Industries, Inc.</u>, 549 F. Supp. 716, 216 USPQ 381 (D. Del. 1982), <u>aff'd.</u>, 726 F.2d 724, 220 USPQ 841 (Fed. Cir. 1984).

Not only has the Federal Circuit admonished that anticipation cannot be based on teachings which are vague or based on conjecture, but also made clear that any insufficiency in the reference cannot be cured by any improper interpretation of the reference: "a prior art patent is a reference only for that which it teaches." <u>Corning Glass v. Sumitomo Electric</u>, 9 USPQ2d 1962, 1970 (Fed. Cir. 1989).

Further, anticipation cannot be established based on a piecemeal application of the reference, where the Examiner picks and chooses isolated features of the reference in an attempt to synthesize the claimed invention. "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, <u>arranged as in the claim</u>." *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481, 485 (Fed. Cir. 1984). Hence, it is not sufficient that a single prior art reference discloses each element that is claimed, but the reference <u>also</u> must disclose that the elements <u>are arranged as in</u>

the claims under review. *In re Bond*, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) (citing *Lindemann Maschinenfabrik GmbH*).

Hence, the reference fails to disclose or suggest the claimed determination of priority in each network switch port, or the claimed selective output of a flow control frame based on the determined depletion of network switch resources relative to the determined priority.

For these and other reasons, the §102 rejection of claim 1 should be reversed.

B. **Claim 12 is further patentable under 35 U.S.C. §102(e) over Fawaz.**

Claim 12 specifies an integrated network switch comprising a plurality of network switch ports, and a flow control module. As argued above with respect to claim 1, each network switch port of claim 12 is "configured for receiving a data packet and selectively ***outputting a flow control frame*** in response to a flow control output signal" and includes "a port filter configured for ***determining a corresponding determined priority value for the corresponding received data packet***".

The flow control module is configured for determining a depletion of network switch resources, and storing, for each of the network switch ports, the corresponding determined priority value based on the corresponding received data packet. The flow control module selectively outputs the flow control output signal to ***selected ones of the network switch ports*** based on the determined depletion of network switch resources relative to the respective determined priority values.

Hence, the network switch ports and the flow control module of independent claim 12

perform the same functions specified in claim 1, as described above. Therefore, the rejection of independent claim 12 should be reversed at least for the same reasons as specified above with respect to claim 1; hence, the arguments with respect to claim 1 are incorporated in their entirety herein by reference.

In addition, independent claim 12 specifies an "***integrated*** network switch". As described on page 3, line 24 of the specification, the term "integrated" refers to "single chip". Hence, independent claim 12 further recites that the apparatus is integrated onto a single chip.

In addition, this limitation of the network switch being "integrated" cannot be disregarded simply because it is recited in the preamble. As specified in the MPEP §2111.02, Rev. 2, May 2004 at page 2100-50 to 2100-51: "Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation." (Citing Corning Glass Works v. Sumitomo Elec. U.S.A., Inc., (See also MPEP §2111.02, Rev. 2, May 2004 at page 2100-51: "In claims directed to articles and apparatus, any phraseology in the preamble that limits the structure of that article or apparatus must be given weight" (citing In re Stencel, 828 F.2d 751, 4 USPQ2d 1071 (Fed. Cir. 1987))) (See also Kropa v. Robie, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951)(preamble reciting "An abrasive article" deemed an essential limitation)).

There is no disclosure whatsoever that the QoS nodes of Fawaz are implemented as integrated network switches, as claimed. For this reason alone the §102 rejection of claim 12 should be withdrawn.

C. **Claims 4-11 are patentable under 35 U.S.C. §103(a) in view of Fawaz**

Claims 4, 9, and 10 depend from claim 3 which depends from independent claim 1, hence, the arguments with respect to claim 1 are incorporated in their entirety herein by reference.

As admitted in the Final Action with respect to claim 4, Fawaz does not explicitly teach a method in which the second determining step includes determining whether an availability of the network switch resources falls below a first prescribed threshold value. The Final Action then asserts that it would of been obvious to modify the system of Fawaz to operate on the basis of buffer of availability as opposed to buffer occupancy based on "simple mathematical reasoning". Hence, the Final Action fails to consider the invention as a whole, but focuses on a single element of the claim.

The foregoing comments with respect to claim 1 already demonstrate that Fawaz teaches away from the invention of claim 4 as a whole by <u>periodically outputting</u> control messages that include a current list of all congested SLAs. Fawaz explicitly teaches that the SLAs for nodes "A and C will ***continue to transmit***." (par. 79, lines 15-16).

Hence, Fawaz neither discloses nor suggests ***selectively*** outputting a flow control frame on the network switch port based on the determined depletion of network switch resources (based on the availability of the network switch resources falling below a first prescribed threshold value) relative to the determined priority. Rather, Fawaz periodically outputs control messages, ***regardless*** of the network switch resources, that specifies the current list of all congested SLAs. One having ordinary skill in the art would not have been motivated to modify Fawaz to

selectively output a ***flow control frame*** because such a modification is contrary to the explicit teachings of Fawaz.

For these and other reasons, the rejection of claim 4 should be reversed.

Claim 9 further limits claim 3 by specifying that the determined priority is deleted from the table after a prescribed aging interval. The Final Action admits that Fawaz does not disclose the leading the determined priority from the table after a prescribed aging interval. Moreover, Fawaz neither discloses nor suggests that the table stores a determined priority, as claimed; rather, the table simply stores SLAs, and not determined priorities. Hence, the rejection of claim 9 should be reversed.

Claim 10 further limits claim 3 by setting a plurality of prescribed threshold values based on a plurality of respective user-defined priority thresholds. The Examiner incorporates the arguments of claim 6, which parrots the language of claim 6 without any description whatsoever of how Fawaz describes multiple thresholds, as claimed. The reference to paragraph 57 is misplaced, as there is no description of any threshold. In addition, paragraph 78 provides only a reference to "some threshold H": there is no disclosure or suggestion to modify Fawaz to include multiple threshold, as claimed, especially since Fawaz already sends out control messages that specify the congested SLAs; hence, there is no desirability for Fawaz to use multiple thresholds, since the same threshold can be used to control multiple SLAs.

Claim 10, however, enables the use of multiple prescribed threshold, illustrated in the threshold priority table 42 of Figure 2, to ensure that even higher priority data frames can be halted if the depletion of network switch resources falls below multiple prescribed threshold

values (page 6, lines 13-28).

Fawaz does not even begin to contemplate the problems associated with attempting to implement flow control on multiple switch ports, as claimed. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. MPEP §2141.02, page 2100-127 (Rev. 2, May 2004) (citing W.L. Gore & Assoc. v. Garlock, Inc., 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984)).

For these and other reasons, the rejection of claims 4, 9 and 10 should be reversed.

D. **Claims 14-17 are patentable under 35 U.S.C. §103(a) in view of Fawaz**

Claims 14 and 17 depend from independent claim 12, hence, the arguments with respect to claim 12 are incorporated in their entirety herein by reference.

Claim 14 specifies that the flow control module includes a first table for storing the determined priority values, a second table for storing a plurality of prescribed resource threshold values and respective user-defined priority thresholds.

The Examiner fails to provide any description whatsoever of how Fawaz describes multiple thresholds, as claimed. As described above, the reference to paragraph 57 is misplaced, as there is no description of any threshold. In addition, paragraph 78 provides only a reference to "some threshold H": there is no disclosure or suggestion to modify Fawaz to include multiple threshold, as claimed, especially since Fawaz already sends out control messages that specify the congested SLAs; hence, there is no desirability for Fawaz to use multiple thresholds, since the same threshold can be used to control multiple SLAs.

Further, the Final Action fails to provide any evidence of any motivation by one skilled in the art to modify Fawaz in order to include a first table storing the determined priority values, ***plus*** a second table configured for storing not only prescribed resource threshold values, but also ***respective user-defined priority thresholds*** that enable the flow control module to determine whether a given priority value no longer can be transmitted based on the availability of network resources having fallen below the corresponding associated resource threshold value.

Hence, a user can ***dynamically select*** not only the threshold levels (e.g., T1, T2, T3 of Fig. 2), but also the priority value thresholds that are affected.

There is no evidence whatsoever that one having ordinary skill in the art would have been motivated to modify Fawaz to include a second table having multiple prescribed resource threshold values and respective user-defined priority thresholds, as claimed. In fact, Fawaz teaches away from the features of claim 14 by outputting the control message that includes the current list of all congested SLAs: there is no need for any second table, because Fawaz defines congestion based on the SLAs, and not based on the availability of network resources having fallen below one of multiple prescribed resource threshold values.

Hence, Fawaz does not even begin to contemplate the problems associated with attempting to implement flow control on multiple switch ports, as claimed. A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. MPEP §2141.02, page 2100-127 (Rev. 2, May 2004) (citing W.L. Gore & Assoc. v. Garlock, Inc., 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984)).

For these and other reasons, the rejection of claim 14 should be reversed.

Claim 17 further limits claim 13 by specifying that the flow control module deletes the determined priority for a selected one of the network switch ports from the table after a prescribed aging interval. The Final Action admits that Fawaz does not disclose the leading the determined priority from the table after a prescribed aging interval. Moreover, Fawaz neither discloses nor suggests that the table stores a determined priority, as claimed; rather, the table simply stores SLAs, and not determined priorities. Hence, the rejection of claim 17 should be reversed.

For these and other reasons, the rejections of claims 14 and 17 should be reversed.

Conclusion

For the reasons set forth above, it is clear that Appellant's claims 1, 3-12 and 14-17 are patentable over the reference applied. Accordingly the appealed claims 1, 3-12 and 14-17 should be deemed patentable over the applied reference. It is respectfully requested that this appeal be granted and that the Examiner's rejections be reversed.

To the extent necessary, Appellant petitions for an extension of time under 37 C.F.R. 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including any missing or insufficient fees under 37 C.F.R. 1.17(a), to Deposit Account No. 50-0687, under Order No. 95-320, and please credit any excess fees to such deposit account.

Respectfully submitted,

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Attached: APPENDIX – CLAIMS ON APPEAL

APPENDIX – CLAIMS ON APPEAL

1. (PREVIOUSLY PRESENTED) A method in a network switch having a plurality of network switch ports, the method comprising:

first determining a priority for each data frame received on a corresponding network switch port, each network switch port including a port filter configured for determining the corresponding priority for the corresponding received data frame, the first determining including determining, by the corresponding port filter of the corresponding network switch port having received the data frame, the corresponding priority for the corresponding data frame;

second determining a depletion of network switch resources; and

selectively outputting a flow control frame on the network switch port based on the determined depletion of network switch resources relative to the determined priority.

2. (CANCELED).

3. (ORIGINAL) The method of claim 1, further comprising storing the determined priority within a table configured for storing the determined priority for each of a plurality of the network switch ports.

4. (ORIGINAL) The method of claim 3, wherein the second determining step includes determining whether an availability of the network switch resources falls below a first prescribed threshold value.

5. (ORIGINAL) The method of claim 4, further comprising setting the first prescribed threshold value based on a user-defined priority threshold.

6. (ORIGINAL) The method of claim 5, wherein the setting step includes setting a plurality of prescribed threshold values, including the first prescribed threshold value, based on a plurality of the user-defined priority threshold, respectively.

7. (ORIGINAL) The method of claim 6, wherein:

the first determining step includes determining the priority from a plurality of available priority values;

the second determining step includes determining whether the availability of the network resources has fallen below an identified one of the prescribed threshold values; and

the selectively outputting step includes identifying from the table the network switch ports having respective priority values less than the corresponding user-defined priority threshold for the identified one prescribed threshold value.

8. (ORIGINAL) The method of claim 6, wherein the step of setting the plurality of prescribed threshold values includes storing the prescribed threshold values and the respective user-defined priority thresholds in a second table.

9. (ORIGINAL) The method of claim 3, further comprising deleting the determined priority from the table after a prescribed aging interval.

10. (ORIGINAL) The method of claim 3, further comprising setting a plurality of prescribed threshold values based on a plurality of respective user-defined priority thresholds.

11. (ORIGINAL) The method of claim 10, wherein:

the first determining step includes determining the priority from a plurality of available priority values;

the second determining step includes determining whether the availability of the network resources has fallen below an identified one of the prescribed threshold values; and

the selectively outputting step includes identifying from the table the network switch ports having respective priority values less than the corresponding user-defined priority threshold for the identified one prescribed threshold value.

12. (PREVIOUSLY PRESENTED) An integrated network switch comprising:

a plurality of network switch ports, each configured for receiving a data packet and selectively outputting a flow control frame in response to a flow control output signal, each network switch port including a port filter configured for determining a corresponding determined priority value for the corresponding received data packet; and

a flow control module configured for determining a depletion of network switch resources, the flow control module configured for storing, for each of the network switch ports, the corresponding determined priority value based on the corresponding received data packet, the flow control module selectively outputting the flow control output signal to selected ones of the network switch ports based on the determined depletion of network switch resources relative to the respective determined priority values.

13. (CANCELED).

14. (ORIGINAL) The switch of claim 13, wherein the flow control module includes a first table configured for storing the determined priority values for the respective network switch ports, and a second table configured for storing a plurality of prescribed resource threshold values and respective user-defined priority thresholds, the flow control module configured for determining whether the availability of the network resources has fallen below an identified one of the prescribed resource threshold values.

15. (ORIGINAL) The switch of claim 14, wherein the flow control module is configured for selecting the selected ones of the network switch ports based on the respective determined priority values being less than the corresponding user-defined priority threshold for the identified one prescribed resource threshold value.

16. (ORIGINAL) The switch of claim 14, further comprising a free buffer queue configured for storing unused frame pointers, each unused frame pointer specifying a corresponding buffer memory location available for storage of frame data, the flow control module configured for determining the depletion of network switch resources based on a comparison between a number of the unused frame pointers in the free buffer queue relative to the prescribed resource threshold values.

17. (ORIGINAL) The switch of claim 12, wherein the flow control module deletes the determined priority value for a selected one of the network switch ports after a prescribed aging interval.

18. (CANCELED).